Status of the NRC Decommissioning Program

2005 Annual Report

Division of Waste Management and Environmental Protection
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555–0001

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TABLES

ABBREVIATIONS

CFR	*Code of Federal Regulations*
DP	Decommissioning Plan
DWMEP	Division of Waste Management and Environmental Protection
EA	environmental assessment
EPA	U.S. Environmental Protection Agency
FSSR	final status survey report
FTE	full-time equivalents
FY	fiscal year
IAEA	International Atomic Energy Agency
IDIP	Integrated Decommissioning Improvement Plan
ISCORS	Interagency Steering Committee on Radiation Standards
ISFSI	Independent Spent Fuel Storage Installation
LTP	License Termination Plan
LTR	License Termination Rule
MOU	memorandum of understanding
mrem	millirem
NMSS	Office of Nuclear Material Safety and Safeguards
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OIG	Office of the Inspector General
OIP	Office of International Programs
OMB	Office of Management and Budget
PART	Program Assessment Rating Tool
SER	Safety Evaluation Report
RES	Office of Nuclear Regulatory Research
SDMP	Site Decommissioning Management Plan
TAG	Technical Advisory Group
SRM	staff requirements memorandum
TBD	to be determined
WIR	Waste Incidental to Reprocessing

ALPHABETICAL LISTING OF DECOMMISSIONING SITES BY SITE CATEGORY

DECOMMISSIONING POWER REACTORS

1. BIG ROCK POINT
2. DRESDEN – UNIT 1
3. FERMI – UNIT 1
4. HADDAM NECK – CONNECTICUT YANKEE
5. HUMBOLDT BAY
6. INDIAN POINT – UNIT 1
7. LACROSSE
8. MILLSTONE – UNIT 1
9. NUCLEAR SHIP SAVANNAH
10. PEACH BOTTOM – UNIT 1
11. RANCHO SECO
12. SAN ONOFRE – UNIT 1
13. SAXTON
14. THREE MILE ISLAND – UNIT 2
15. VALLECITOS BOILING WATER REACTOR (VBWR)
16. YANKEE ROWE

17. & 18. ZION – UNITS 1 & 2

RESEARCH AND TEST REACTORS

1. CORNELL UNIVERSITY – TRIGA
2. CORNELL UNIVERSITY – ZPR
3. FORD NUCLEAR REACTOR
4. GENERAL ATOMICS – TRIGA MARK I
5. GENERAL ATOMICS – TRIGA MARK F
6. GENERAL ELECTRIC CO. – GETR
7. GENERAL ELECTRIC CO. – EVESR
8. MANHATTAN COLLEGE
9. NASA – MOCKUP
10. NASA – PLUM BROOK
11. UNIVERSITY OF BUFFALO
12. UNIVERSITY OF ILLINOIS
13. UNIVERSITY OF VIRGINIA
14. UNIVERSITY OF VIRGINIA – CAVALIER
15. UNIVERSITY OF WASHINGTON
16. VETERANS ADMINISTRATION
17. WESTINGHOUSE

CURRENT COMPLEX MATERIAL SITES UNDERGOING DECOMMISSIONING

1. AAR MANUFACTURING, INC
2. ABB PROSPECTS, INC. (FORMERLY C.E. WINDSOR)
3. BABCOCK & WILCOX (SHALLOW LAND DISPOSAL AREA)
4. BATTELLE COLUMBUS LABORATORIES
5. CABOT PERFORMANCE MATERIALS, INC
6. CURTISS-WRIGHT CHESWICK
7. DEPARTMENT OF THE ARMY - FT. BELVOIR
8. DEPARTMENT OF THE ARMY - FT. MCCLELLAN
9. DOW CHEMICAL COMPANY (DOW)
10. EGLIN AIR FORCE BASE
11. ENGELHARD MINERALS – GREAT LAKES
12. FMRI (FANSTEEL), INC.
13. HERITAGE MINERALS, INC
14. HOMER LAUGHLIN CHINA
15. JEFFERSON PROVING GROUND
16. KAISER ALUMINUM
17. KERR McGEE – CIMARRON
18. KERR McGEE – CUSHING REFINERY SITE
19. KIRTLAND AIR FORCE BASE
20. MALLINCKRODT CHEMICAL, INC. (MALLINCKRODT)
21. MOLYCORP INC. – WASHINGTON
22. NWI BRECKENRIDGE
23. PATHFINDER
24. QUEHANNA (FORMERLY PERMAGRAIN PRODUCTS, INC.)
25. ROYERSFORD WASTEWATER TREATMENT FACILITY
26. SAFETY LIGHT CORPORATION (SLC)
27. SALMON RIVER
28. SC HOLDINGS, INC.
29. SHIELDALLOY METALLURGICAL CORPORATION (SMC)
30. STEPAN CHEMICAL COMPANY
31. SUPERIOR STEEL (FORMERLY SUPERBOLT)
32. UNC NAVAL PRODUCTS
33. UNION CARBIDE CORPORATION
34. WEST VALLEY
35. WESTINGHOUSE ELECTRIC COMPANY - BLAIRSVILLE
36. WESTINGHOUSE ELECTRIC COMPANY (HEMATITE FACILITY)
37. WESTINGHOUSE ELECTRIC COMPANY, WALTZ MILL
38. WHITTAKER CORPORATION

TITLE II SITES UNDERGOING DECOMMISSIONING

1. AMERICAN NUCLEAR CORPORATION
2. BEAR CREEK
3. EXXONMOBIL HIGHLANDS
4. HOMESTAKE
5. PATHFINDER – LUCKY MC
6. PATHFINDER – SHIRLEY BASIN
7. RIO ALGOM – AMBROSIA LAKE
8. UMETCO MINERALS CORPORATION
9. UNITED NUCLEAR CORPORATION (UNC)
10. WESTERN NUCLEAR, INC. – SPLIT ROCK
11. COGEMA MINING, INC
12. SEQUOYAH FUELS CORPORATION (SFC)

FUEL CYCLE FACILITIES UNDERGOING DECOMMISSIONING

1. FRAMATOME RICHLAND
2. GENERAL ATOMICS
3. HONEYWELL

4. Introduction

This report provides a comprehensive summary of the U.S. Nuclear Regulatory Commission's (NRC's) decommissioning program. Its purpose is to provide a reference document that summarizes the decommissioning activities in fiscal year (FY) 2005, including the decommissioning of complex material sites, commercial reactors, research and test reactors, uranium mill tailings facilities, and fuel cycle facilities. In addition, this report discusses accomplishments in the decommissioning program since last year's report (NUREG-1814), and identifies key decommissioning program issues that the staff will address in the coming year. The 2004 Annual Report was published as a NUREG in accordance with Commission direction provided in the Staff Requirements Memorandum (SRM) to SECY 03-0161. The SRM to SECY-04-0024 approved several changes to the Annual Decommissioning Report including publishing the annual report as a NUREG in the even years, and in odd years, as a shortened report to the Commission, using references to the decommissioning website. This 2005 Annual Report is the first report using the shortened format.

1. Decommissioning Sites

NRC regulates the decontamination and decommissioning of materials and fuel cycle facilities, power reactors, research and test reactors, and uranium recovery facilities, with the ultimate goal of license termination. A broad spectrum of activities associated with these program functions is summarized in this report.

On June 17, 2004, the elimination of the Site Decommissioning Management Plan (SDMP) designation was announced in the *Federal Register* (69 *Federal Register* 33946). NRC now manages materials decommissioning sites as "complex sites," under a comprehensive decommissioning program. The SDMP designation will be used in this report only to describe the cleanup criteria prior to the License Termination Rule (LTR).

Approximately 200 materials licenses are terminated each year. Most of these license terminations are routine, and the sites require little, if any, remediation to meet NRC's unrestricted release criteria. The decommissioning program focuses on termination of licenses that are not routine, because the sites involve more complex decommissioning activities.

Currently, there are 18 nuclear power reactors, 17 research and test reactors, 38 complex decommissioning materials facilities, three fuel cycle facilities (partial decommissioning), and 12 uranium recovery facilities that are undergoing non-routine decommissioning or are in long-term safe storage, under NRC jurisdiction.

Through the Agreement State Program, 33 States have signed formal agreements with NRC, by which those States have assumed regulatory responsibility over certain byproduct, source, and small quantities of special nuclear material, including decommissioning of some complex materials sites. Agreement States do not have regulatory authority over operating or decommissioning nuclear power plants.

2.1 Reactor Decommissioning

2.1.1 Power Reactors

Power reactor decommissioning activities include: (a) project management for decommissioning power reactors and technical review responsibility for licensee submittals in support of decommissioning; (b) core inspection; and (c) support for development of rulemaking and guidance.

The Office of Nuclear Material Safety and Safeguards (NMSS) currently has regulatory project management responsibility for 13 decommissioning power reactors. The Office of Nuclear Reactor Regulation (NRR) has project management responsibility for two decommissioning reactors (Indian Point – Unit 1; Millstone – Unit 1). Because of extensive stakeholder interest in these sites (for both the operating and decommissioning units), it is more efficient for NRR also to perform project management responsibilities for the permanently shutdown units. In addition, NRR has decommissioning project management for three early demonstration reactors—Vallecitos, Nuclear Ship Savannah, and Saxton. Table 2–1 identifies the power reactors undergoing decommissioning. Plant status summaries for all decommissioning reactors can be viewed on-line by accessing NRC's Decommissioning website (http://www.nrc.gov/what-we-do/regulatory/decommissioning/power-reactor-sites.html).

In FY 2005, decommissioning activities were completed at two power reactors. In December 2004, the Trojan Nuclear Plant completed decommissioning activities, submitted the last supplement of its Final Status Survey Report (FSSR), and submitted an application for termination of its Facility Operating License. The staff terminated Trojan Nuclear Plant's 10 CFR Part 50 Operating License No. NPF-1 on May 23, 2005. The site was released for unrestricted use. The Trojan Nuclear Plant still holds a 10 CFR Part 72 Independent Spent Fuel Storage Installation (ISFSI) license.

Maine Yankee Atomic Power Company (Maine Yankee) also completed decommissioning activities and submitted its FSSR in FY 2005. The FSSR demonstrated that the Maine Yankee site successfully met the 25 mrem/yr unrestricted release criteria of 10 CFR Part 20, Subpart E. The staff expects to amend the Maine Yankee's License No. DPR-36, to reduce the site boundaries to approximately the footprint of the ISFSI in September 2005.

Also in FY 2005, NMSS approved the License Termination Plans (LTPs) for Big Rock Point and Yankee Rowe. Table 2–1 provides a schedule for current reactor decommissioning activities.

In FY 2005, Regional inspectors continued to support local decommissioning advisory panel meetings at Yankee Rowe, Haddam Neck, and Maine Yankee.

Table 2–1
Power Reactors Undergoing Decommissioning

Reactor		Location	PSDAR** Submitted	LTP Submitted	LTP Approved	Completion of Decom.
1	Big Rock Point	Charlevoix, MI	3/98	4/03	3/05	12/12
2	Dresden – Unit 1	Dresden, IL	6/98	TBD	TBD	TBD
3	Fermi – Unit 1	Newport, MI	4/98	2006*	2007	2008
4	Haddam Neck – Connecticut Yankee	Meriden, CT	8/97	7/00	11/02	2007
5	Humboldt Bay	Eureka, CA	2/98	2007*	2008	TBD
6	Indian Point – Unit 1	Buchanan, NY	1/96	TBD	TBD	TBD
7	Lacrosse	LaCrosse, WI	5/91	TBD	TBD	TBD
8	Millstone – Unit 1	Waterford, CT	6/99	TBD	TBD	TBD
9	Nuclear Ship Savannah	Newport News, VA	TBD	TBD	TBD	TBD
10	Peach Bottom – Unit 1	Delta, PA	6/98	2012*	2013	2014
11	Rancho Seco	Sacramento, CA	12/94	2005*	2006	2008
12	San Onofre – Unit 1	San Clemente, CA	12/98	TBD	TBD	TBD
13	Saxton	Saxton, PA	1996	2/00	3/03	2005
14	Three Mile Island – Unit 2	Harrisburg, PA	2/79	TBD	TBD	TBD
15	Vallecitos - Boiling Water Reactor (VBWR)	Sunol, CA	7/66	TBD	TBD	TBD
16	Yankee Rowe	Greenfield, MA	11/94	4/04	7/05	2008
17	Zion – Units 1 & 2	Waukegan, IL	2/00	TBD	TBD	TBD

* estimated date ** PSDAR or DP equivalent

NOTE: DP - Decommissioning Plan; LTP - License Termination Plan; PSDAR - Post Shutdown Decommissioning Activities Report; TBD - To Be Determined

2.1.2 Research and Test Reactors

NRR provides project management and inspection oversight for 17 decommissioning research and test reactors. Currently, 14 research and test reactors have decommissioning orders or amendments. Additionally, three research and test reactors are in "possession-only" status, either waiting for shutdown of another research or test reactor at the site, or for removal of the fuel from the site by the U.S. Department of Energy. Table 2–2 identifies the research and test reactors undergoing decommissioning. Plant status summaries for research and test reactors can be viewed on-line by accessing NRC's Decommissioning website (http://www.nrc.gov/what-we-do/regulatory/decommissioning/res-test-reactor-sites.html).

Table 2–2
Research and Test Reactors Undergoing Decommissioning

Reactor		Location	Status	Completion of Decom.
1	Cornell University – ZPR	Ithaca, NY	DECON-Amendment	2010
2	Cornell University – TRIGA	Ithaca, NY	DECON-Amendment	2010
3	Ford Nuclear Reactor	Ann Arbor, MI	DECON-Amendment	2008
4	General Atomics – TRIGA Mark F	San Diego, CA	DECON-Approved	TBD
5	General Atomics – TRIGA Mark I	San Diego, CA	DECON-Approved	TBD
6	General Electric Co. – GETR	Sunol, CA	Possession-Only	TBD[1]
7	General Electric Co. – EVESR	Sunol, CA	Possession-Only	TBD[1]
8	Manhattan College	Bronx, NY	DECON-Approved	2005
9	NASA - Mockup	Sandusky, OH	DECON-Approved	2010
10	NASA - Plum Brook	Sandusky, OH	DECON-Approved	2010
11	University of Buffalo	Buffalo, NY	Possession-Only	>2012[2]
12	University of Illinois	Urbana, IL	DECON-Approved	TBD[3]

[1]Because of "the presence of other nuclear facilities at the site," decommissioning held in abeyance in accordance with 10 CFR 50.82(b)(4)(i).

[2]Currently, there is no firm date for DOE to accept shipment of the spent fuel. A DP has not been submitted.

[3]The licensee is developing a final DP that will be submitted to NRC for approval.

Reactor		Location	Status	Completion of Decom.
13	University of Virginia – Cavalier	Charlottesville, VA	DECON-Approved	2005
14	University of Virginia	Charlottesville, VA	DECON-Approved	2005
15	University of Washington	Seattle, WA	DECON-Approved	2010
16	Veterans Administration	Omaha, NE	DECON-Amendment	2010
17	Westinghouse	Waltz Mill, PA	DECON-Approved	2008

2.2 Materials Facilities Decommissioning

2.2.1 Complex Materials Sites Undergoing Decommissioning

Currently, there are 38 complex materials sites undergoing decommissioning (see Table 2–3). Since last year's status report, one site was added to the complex site list (Department of Army - Ft. Belvoir), and six sites were removed from the complex site list through license termination or completion of decommissioning: (1) Alliant Ordinance and Ground Systems; (2) Augustana College; (3) Engelhard Minerals - Ravenna; (4) Kerr McGee Technical Center; (5) Kiski Valley Water Pollution Control Authority; and (6) Michigan Department of Natural Resources.

Table 2-3 identifies the clean-up criteria for each complex site as either License Termination Rule 10 CFR Part 20, Subpart E or SDMP Action Plan criteria. The LTR authorized two different sets of cleanup criteria—the concentration-based SDMP Action Plan criteria and the dose-based LTR criteria. Under the provisions of 10 CFR 20.1401(b), any licensee that submitted its decommissioning plan (DP) before August 20, 1998, and received NRC approval of that DP before August 20, 1999, could use the SDMP Action Plan criteria for site remediation. In the SRM on SECY-99-195, the Commission granted an extension of the DP approval deadline, for 12 sites, to August 20, 2000. In September 2000, the staff notified the Commission that all 12 DPs were approved by the deadline. All other sites must use the dose-based criteria of the LTR. Status summaries for the Complex Materials Sites undergoing decommissioning can be viewed on-line by accessing NRC's Decommissioning website (http://www.nrc.gov/what-we-do/regulatory/decommissioning/complex-sites.html). These summaries describe the status of each site and identify the current technical and regulatory issues impacting completion of decommissioning. For those licensees that have submitted a DP, the schedules are based on an assessment of the complexity of the DP review. For those licensees that have not submitted a DP, the schedules are based on other licensee information available, and the anticipated decommissioning approach.

Activities associated with the complex materials site decommissioning program include: (a) review and approval of DPs; (b) conduct of pre-DP development meetings with licensees; (c) review of licensee FSSRs and conduct of confirmatory surveys; (d) conduct of in-process inspections; and (e) preparation of Environmental Assessments (EAs) and Safety Evaluation

Reports (SER)(s). In FY 2005, the staff approved DPs for three sites: Michigan Department of Natural Resources, Pathfinder, and Ft. Belvoir. The staff currently is reviewing DPs that were submitted in FY 2005 for Cabot Corporation, Dow Chemical Company, Eglin Air Force Base, Mallinckrodt Chemical, Inc., SC Holdings Inc., and Westinghouse Electric Company (Hematite Facility).

In addition, the staff routinely reviews financial assurance submittals for materials and fuel cycle facilities, and maintains a financial instrument security program. Approximately 50 financial assurance submittals were reviewed in FY 2005.

Table 2–3
Current Complex Materials Sites Undergoing Decommissioning

Name		Location	Date DP Submitted	Date DP Approved	Cleanup Criteria	Completion of Decom.
1	AAR Manufacturing, Inc.	Livonia, MI	10/97 Revised 7/05	5/98 2/06*	LTR-RES	1/07
2	ABB Prospects, Inc.	Windsor, CT	4/03	6/04	LTR-UNRES	12/07
3	Babcock & Wilcox (Shallow Land Disposal Area)	Vandergrift, PA	2/07*	5/07*	LTR-UNRES	10/09
4	Battelle Columbus Laboratories	Columbus, OH	8/00	2001	Action-UNRES	12/05
5	Cabot Performance Materials, Inc. (Cabot)	Reading, PA	11/02 Revised 6/05	7/06*	LTR-UNRES	4/07
6	Curtis-Wright Cheswick	Cheswick, PA	6/05	TBD	LTR-UNRES	12/08
7	Department of the Army	Fort Belvoir, VA	4/04	6/05	LTR-UNRES	11/05
8	Department of the Army	Fort McClellan, AL	3/99	3/01	LTR-UNRES	12/05
9	Dow Chemical Company	Bay City, MI	10/95 Revised 12/03	7/97 9/05*	LTR-UNRES	7/06

Table 2–3
Current Complex Materials Sites Undergoing Decommissioning

Name		Location	Date DP Submitted	Date DP Approved	Cleanup Criteria	Completion of Decom.
10	Eglin Air Force Base	Walton County, FL	8/03	9/05*	LTR-UNRES	12/05
11	Engelhard Minerals	Great Lakes, IL	NA	NA	LTR-UNRES	TBD
12	FMRI (Fansteel) Inc.	Muskogee, OK	8/99 Revised 5/03	12/03	LTR-UNRES	6/23
13	Heritage Minerals	Lakehurst, NJ	11/97	10/99	Action-UNRES	1/06
14	Homer Laughlin	Newell, WV	1/95	1/95	LTR-UNRES	12/06
15	Jefferson Proving Ground (Department of Army)	Madison, IN	8/99 Revised TBD	TBD	LTR-RES	9/10
16	Kaiser Aluminum	Tulsa, OK	(Phase 1) 8/98 (Phase 2) 5/01	2/00 6/03	Action-UNRES LTR-UNRES	3/06
17	Kerr-McGee	Cimarron, OK	4/95	8/99	Action-UNRES	5/07
18	Kerr-McGee	Cushing, OK	8/98	8/99	Action-UNRES	12/05
19	Kirtland Air Force Base	Albuquerque, NM	11/02	1/03	LTR-UNRES	12/05
20	Mallinckrodt Chemical Inc. (Mallinckrodt)	St. Louis, MO	(Phase 1) 11/97 (Phase 2) 5/03	5/02 10/05*	LTR-UNRES	7/08
21	Molycorp, Inc. – Washington	Wash., PA	6/99	8/00	Action-UNRES	10/07

Table 2–3
Current Complex Materials Sites Undergoing Decommissioning

Name		Location	Date DP Submitted	Date DP Approved	Cleanup Criteria	Completion of Decom.
22	NWI Breckenridge	Breckenridge, MI	3/04	8/04	LTR-UNRES	TBD
23	Pathfinder	Souix Falls, SD	2/04	7/05	LTR-UNRES	12/06
24	Quehanna (formerly Permagrain Products, Inc.)	Media, PA	4/98, Revised 3/03	7/98 9/03	Action- UNRES	TBD
25	Royersford Wastewater Treatment Facility	Royersford, PA	TBD	TBD	LTR-UNRES	TBD
26	Safety Light Corp. (SLC)	Bloomsburg, PA	12/00	12/01	LTR-UNRES	12/07
27	Salmon River	Salmon, ID	TBD	TBD	LTR-UNRES	5/12
28	SC Holdings, Inc.	Kawkawlin, MI	11/03	12/05*	LTR-UNRES	1/09
29	Shieldalloy Metallurgical Corp.	Newfield, NJ	10/05*	1/07*	LTR-RES	11/10
30	Stepan Chemical Company	Maywood, NJ	NA	NA	LTR-UNRES	12/08
31	Superior Steel (formerly Superbolt)	Pittsburgh, PA	TBD	TBD	LTR-UNRES	TBD
32	Union Carbide	Lawrenceberg, TN (Buildings) (Soil)	8/98	7/00 12/00	Action- UNRES LTR-UNRES	10/07
33	UNC Naval Products	New Haven, CT	8/98	4/99	LTR-UNRES	TBD
34	West Valley	West Valley, NY	8/06*	11/07*	LTR- UNRES**	TBD
35	Westinghouse Electric	Blairsville, PA	NA	NA	LTR-UNRES	3/06
36	Westinghouse Electric (Hematite Facility)	Jefferson City, MO	8/05	8/06*	LTR-UNRES	3/10

Table 2–3
Current Complex Materials Sites Undergoing Decommissioning

Name		Location	Date DP Submitted	Date DP Approved	Cleanup Criteria	Completion of Decom.
37	Westinghouse Electric	Madison, PA	4/97	1/00	LTR-UNRES	9/06
38	Whittaker Corp.	Greenville, PA	12/00 Revised 12/05*	4/06*	LTR-UNRES	8/06

* Estimated Date

** The West Valley DP has not yet been submitted. The staff anticipates the DP will include plans to release a large portion of the site for unrestricted use, and the remainder of the site may have a perpetual license or be released with restrictions.

NOTES:
1. The cleanup criteria identified in this table presents the staff's most recent information, but does not necessarily represent the final outcome.
2. Abbreviations used in this table include: (1) Action - SDMP Action Plan Criteria; (2) LTR - LTR Criteria; (3) RES - Restricted Use; (4) UNRES - Unrestricted Use; (5) TBD - To Be Determined; and (6) NA - Not Applicable
3. A DP submittal date of NA means a DP will not be submitted because remediation is being performed under a Record of Decision.

2.2.2 Uranium Recovery Facilities

NMSS provides project management and technical review for decommissioning and reclamation of facilities regulated under 10 CFR Part 40, Appendix A. These licensees include conventional uranium mills and in-situ leach facilities. Currently, there are 12 NRC-licensed [Uranium Mill Tailings Radiation Control Act Title II] sites in decommissioning. Table 2–4 identifies the Title II decommissioning sites. Site status summaries can be viewed on-line by accessing NRC's Decommissioning website (http://www.nrc.gov/what-we-do/regulatory/decommissioning/uran-recov-sites.html).

Uranium recovery decommissioning activities in the Division of Fuel Cycle Safety and Safeguards include: (a) regulatory oversight of decommissioning uranium recovery (milling) sites; (b) review of site characterization plans and data; (c) review and approval of DPs; (d) preparation of EAs; (e) inspection of decommissioning, including confirmatory surveys; (f) decommissioning cost estimate reviews (including annual surety updates); and (g) oversight of license termination.

In FY 2005, the Uranium Recovery staff completed over 35 licensing actions. The most significant of the decommissioning actions included:

- Termination of licenses for two Title II uranium mills (Sohio Western L-Bar and Petrotomics) and transfer of these sites to Department of Energy under a NRC general license, pursuant to 10 CFR 40.28.

- Approval of an application for alternate concentration limits for Pathfinder - Shirley Basin.

- Approval of ground-water monitoring plans for Western Nuclear, Inc, and Sequoyah Fuels Corporation.

- Approval of the relocation and closure of evaporation ponds for Rio Algom.

In SECY-05-0047, "Status of Efforts by Western Nuclear, Inc., to Acquire Off-Site Properties in Conjunction with Decommissioning Its Uranium Recovery Site," the staff reported that Western Nuclear, Inc., had acquired all but one of the off-site properties. As stated in that Commission Paper, staff is currently evaluating this submittal and is preparing a separate Commission Paper containing the results of that review.

Table 2–4
Decommissioning Title II Uranium Recovery Sites

	Name	Location	DP Approved	License Termination
1	American Nuclear Corporation	Gas Hills, WY	10/88, Revision 2006*	2007
2	Bear Creek	Converse County, WY	5/89	2004
3	ExxonMobil Highlands	Converse County, WY	1990	2005
4	Homestake	Grants, NM	Revised plan - 3/95	2015
5	Pathfinder -Lucky MC	Gas Hills, WY	Revised plan - 6/96	2005
6	Pathfinder -Shirley Basin	Shirley Basin, WY	Revised plan - 12/97	2007
7	Rio Algom - Ambrosia Lake	McKinley Co., NM	2003 (mill) 2005 (soil)*	2008
8	Umetco Minerals Corp.	East Gas Hills, WY	Revised soil plan - 4/01	2006
9	United Nuclear Corporation	Church Rock, NM	3/91, Revision 2006*	2015
10	Western Nuclear Inc. – Split Rock	Jeffrey City, WY	1997	2007
11	COGEMA Mining Inc.	Johnson & Campbell Counties, WY	12/01	2007
12	Sequoyah Fuels Corporation	Gore, OK	2006*	2010
* Projected approval date				

2.2.3 Fuel Cycle Facilities

NMSS provides licensing oversight and decommissioning project management to fuel cycle facilities, including conversion plants, enrichment plants, and fuel manufacturing plants. Most of these facilities have been in operation for 20 or more years. As technology improves and operations at these facilities change, there are often unused areas on the sites that have residual contamination. The NRC staff continues to work closely with the States and Environmental Protection Agency (EPA) to regulate remediation of unused portions of fuel cycle facilities.

Table 2–5 identifies the fuel cycle facilities with current decommissioning activities. Regulation of fuel cycle facilities is accomplished through a combination of: (a) regulatory requirements; (b) licensing; (c) safety oversight, including inspection, assessment of performance, and enforcement; (d) operational experience evaluation; and (e) regulatory support activities. Summaries of the decommissioning activities at fuel fabrication facilities can be viewed online by accessing NRC's Decommissioning website (http://www.nrc.gov/what-we-do/regulatory/decommissioning/fuel-cycle-fac.html).

In 2005, one conversion facility (Honeywell) and two fuel manufacturers (Framatome Richland and General Atomics) continued some decommissioning activities.

Table 2–5
Fuel Cycle Facilities Undergoing Decommissioning

	Name	Location	Status
1	Framatome Richland	Richland, WA	Active
2	General Atomics	San Diego, CA	Active
3	Honeywell	Metropolis, IL	Active

3. Guidance and Rulemaking Activities

In previous years, the staff considered broad-scope regulatory improvements for decommissioning nuclear power plants in the areas of security, emergency planning, and insurance. However, because of continuing staff efforts to reassess vulnerabilities and redefine the threats in the area of safeguards and security, the priority for decommissioning regulatory improvements for decommissioning reactors has been reduced. A relatively small number of nuclear power plants are undergoing decommissioning, and the staff does not anticipate additional nuclear power plants decommissioning soon. Given that additional nuclear power plant decommissionings are not anticipated, resources are being deferred for future nuclear power plant decommissioning rulemakings that are currently in progress or related to security matters. Resources for nuclear power plant decommissioning rulemakings that are not currently in progress or related to security matters were not included in the FY 2005 budget and are not included in the FY 2006 budget. If any plants do unexpectedly shut down permanently,

decommissioning regulatory issues would continue to be addressed through the amendment and exemption process in a manner similar to the current practice.

In FY 2005, the staff continued guidance development resulting from the LTR Analysis. Stakeholder input on staff guidance development and rulemaking efforts was received during a two-day public workshop on decommissioning held by the Division of Waste Management and Environmental Protection (DWMEP) in April 2005. The workshop was attended by approximately 200 people, consisting of NRC staff, licensees, industry representatives, consultants, representatives from other Federal agencies, and State representatives. During the workshop, staff received stakeholder input on topics related to the LTR analysis. Major guidance development activities in FY 2005 included:

- In September 2005, the staff completed draft revised guidance for the following LTR Analysis issues: (a) restricted use/institutional controls; (b) on-site disposal; (c) removal of material after license termination; (d) realistic scenarios; and (e) intentional mixing of soil. This guidance addresses the specific recommendations approved by the Commission to resolve the LTR Analysis issues (SRM-SECY-03-0069). Draft revised guidance was also developed for other topics, including engineered barriers, and use of Multi-Agency Radiation Laboratory Analytical Protocols. Early input from stakeholders at the Decommissioning Workshop in April, a State working group, and an Advisory Committee on Nuclear Waste working group contributed to the staff's development of the draft guidance. The draft revised guidance is scheduled to be published for public comment in September 2005, and the staff will inform the Commission of public comments on the restricted use/institutional control issue and other issues before the guidance is finalized in FY 2006.

- During FY 2005 the staff used a risk-informed approach to inventory and evaluate information from 82 decommissioning sites to identify which of these sites had subsurface contamination and what caused the contamination. This information was used to identify the types of facilities, components, and operational activities that could have a higher "risk", or potential, for subsurface contamination. Based on these results, general inspection guidance is scheduled to be completed in September 2005. This guidance will be used in FY 2006 to develop specific inspection and enforcement procedures tailored to the types of facilities, components, and activities identified in FY 2005. The general guidance will also be used for developing the FY 2006 proposed rulemaking and supporting draft decommissioning guidance. The rulemaking, guidance, and procedures address the LTR Analysis issues related to preventing future legacy sites.

- The staff began limited work, during FY 2005, for the proposed rulemaking and supporting guidance related to preventing future legacy sites planned for FY 2006. This work centered around preparing for, and obtaining, early input from stakeholders at the Decommissioning Workshop.

4. Research Activities

The Office of Nuclear Regulatory Research (RES) continued providing information, to NMSS, to support dose modeling of releases of radioactive material from decommissioning sites. In addition to research activities, RES staff provided technical support for three specific case reviews (Cimarron, Jefferson Proving Ground, and West Valley) and developed input for

revised decommissioning guidance on the use of engineered barriers. Several examples of this research information provided are discussed in the following paragraphs.

RES is supporting development or modification of a number of computer codes useful for site decommissioning analyses. The RES is modifying dose-assessment codes to incorporate added realism; RESRAD-OFFSITE is being enhanced to enable assessment of more-realistic scenarios for potential future human exposure; FRAMES (Framework for Risk Assessment of Multimedia Environmental Systems); and GMS (the Department of Defense Groundwater Modeling System) are being linked to enable the assessment of complex ground-water systems or sites with existing groundwater contamination; and new data and models for food pathways are being developed to support improved dose calculations. The SADA (Spatial Analysis and Decision Assistance) is being supported to provide aid for characterizing a contaminated site, assessing risk, determining the location of future samples, or designing remedial action. During the past year, RES also has provided training to NMSS on use of RESRAD-OFFSITE, GENII (the Hanford Environmental Radiation Dosimetry Software System) in FRAMES, and SADA. These codes currently are under testing, evaluation, and verification for beneficial application to ongoing reviews at complex decommissioning sites. For example, RESRAD-OFFSITE and FRAMES are being tested for dose modeling analysis of the hybrid Jefferson Proving Ground site. Further, the SADA code is being used to simulate source terms at complex sites in a more realistic fashion, and is being applied in the evaluation of the source term of residual activity at the West Valley Demonstration Project and Mallinckrodt decommissioning sites.

In 2005, RES has advanced the modeling of geochemical processes during radionuclide transport through complex subsurface environments, provided an improved technical basis for estimating financial assurance requirements for the decommissioning on in-situ leach mines, and reported on the advantages and limitations of applying more realistic modeling of geochemical processes to decommissioning. RES also is advancing the understanding of the evolution and degradation of clay covers through laboratory testing.

RES has initiated two technical advisory groups (TAGs) that include NMSS decommissioning staff. These TAGs serve to enhance communication on issues important to site decommissioning and provide feedback to RES on research direction. The TAGs are the "Technical Advisory Group on Ground-Water and Performance Monitoring," and the "Technical Advisory Group on Assessing Uncertainty in Simulation Modeling of Environmental Systems."

During the past year, RES staff also continued to support interagency cooperative activities. One example was the development of the draft Multi-Agency Radiological Survey Assessment for Materials and Equipment. The RES staff along with NMSS staff, continued participation in activities of the Interagency Steering Committee on Radiation Standards (ISCORS) and the Interagency Steering Committee on Multimedia Environmental Models. An example of this work is NUREG-1783, "ISCORS Assessment of Radioactivity in Sewage Sludge: Modeling to Assess Radiation Doses."

5. International Activities

The DWMEP interacts with international organizations and governments in a number of ways including: (a) participating in the International Atomic Energy Agency (IAEA); (b) participating in the Organization for Economic Cooperation and Development's (OECD) Nuclear Energy Agency (NEA); (c) participating in bilateral and trilateral exchanges with other countries; (d) hosting foreign assignees and providing reciprocal assignments; (e) developing and providing workshops to requesting countries; and, (f) providing technical support as needed to the NRC Office of International Programs (OIP). The NRC generally is recognized in the international nuclear community as an experienced leader in the decommissioning of nuclear sites. NRC staff interaction with international organizations and governments allows NRC to share insights into decommissioning approaches that are successful, safe, and cost-effective. It also allows the NRC staff to provide input into the various international guidance and requirements that NRC and NRC licensees will need to consider as they interact in a global environment. The NRC staff gains insight into approaches and methodologies that are being employed in the international community and considers these approaches as they continue to risk-in form the NRC Decommissioning Program. A summary of the most significant of these activities is provided below.

IAEA Activities

The NRC decommissioning staff participated in the development of the IAEA Safety Standards Series. Within the past year, staff supported the IAEA by:

- Participating in the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. Staff activities included: (a) revision of the U.S. National Report; (b) coordination and support of regional workshops to promote ratification of the Joint Convention by other IAEA Member States; and (c) preparation of a revised spent fuel and radioactive waste program review process to be considered for the 3rd cycle of the Joint Convention review process.

- Performing a Member State review of Review of DS172, "Implementation of the Remediation Process for Past Activities and Accidents." Comments were forwarded to the IAEA by the OIP in February 2005.

- Performing a Member State review of DS-333, "Safety Requirements for the Decommissioning of Nuclear Facilities." In May 2005, decommissioning staff participated in a Consultant Services Meeting at the IAEA headquarters in Vienna, Austria to review and address Member State comments on DS-333.

- Performing a Member State review of DS-332, "Safety Guide on the Removal of Sites and Buildings from Regulatory Control upon the Termination of Practices." The review was completed and forwarded to the IAEA, by OIP, in May 2005.

- Participating in twice-yearly meetings of the IAEA Waste Safety Standards Committee, which addresses decommissioning specifically, as part of the waste safety activities of the IAEA. Safety Standards series publications, such as DS-172, DS-333, and DS-332, undergo review by this committee after preparation and revision of the draft standards.

- Participating in a meeting in June 2005, to assist in the development of a draft Safety Report on Decommissioning Strategies (Region IV staff).

OECD/NEA

The NEA Radioactive Waste Management Committee (RWMC) Working Party on Decommissioning and Dismantling (WPDD) facilitates information exchange and cooperation among the regulators and implementers in the decommissioning field. The work program analyzes issues from decommissioning projects conducted world wide and promotes the sharing of experience on technical and stakeholder issues. Among its products, the WPDD maintains a compilation of national fact sheets on decommissioning in each member country and has released a pamphlet which demonstrates accomplishments in the decommissioning of a range of fuel cycle facilities. The WPDD has also produced technical products which are of use to the NRC including work on the decommissioning safety case and decommissioning waste volumes. Also, a successful workshop was held in September 2004 in cooperation with NEA standing committees, the European Union and the IAEA. The workshop highlighted technical, regulatory and implementation issues which would benefit from international cooperation. It also identified recent successes in stakeholder involvement. This input will be considered in formulating the program of work for the WPDD. NRC will have an opportunity to influence this program of work to benefit our needs.

DWMEP staff and management participated on the RWMC WPDD which continued work on:

a. A Decommissioning Safety Case document;
b. A Status paper on Release of Sites; and
c. A Status paper on Decommissioning Strategy Selection.

And published:

a. A booklet entitled "The Decommissioning and Dismantling of Nuclear Facilities: Status, Approaches, Challenges" which provides, in non-specialist terminology, a concise overview of the status of decontamination and dismantlement of nuclear facilities and of the associated issues in NEA Member countries; and

b. A NEA brochure which looks at decommissioning across the spectrum of nuclear power facilities and shows worldwide examples of successful projects.

Bilateral and Trilateral Exchanges with Other Countries

Delegations from France, Spain, and Indonesia visited NRC in FY 2005 to discuss many topics associated with radioactive waste management. Facility decommissioning, especially for nuclear power plants, is usually of significant interest to the visiting delegations.

In addition to hosting individual delegations, the staff participates in a bilateral exchange with the French Directorate General for Nuclear Safety Agency. Decommissioning is one of the many topics discussed during the exchange. The bilateral exchange with the French takes place twice a year; once in the United States and once in France. On October 14-15, 2004, NRC representatives met with representatives from the General Directorate for Nuclear Safety

and Radiological Protection and Electricite de France in Lyon, France. The objective was to focus on comparing the French and U.S. regulatory approaches for reactor decommissioning.

Developing and Providing Workshops to Requesting Countries

On June 24-30, 2005, DWMEP staff conducted a workshop on decommissioning for the Russian Rostekhnadzor in Moscow. The purpose of this meeting was to familiarize the NRC-equivalent organization of Russian regulators with the process that NRC uses for decommissioning NRC-licensed sites.

6. Program Integration

The staff continues to take steps to ensure integration of decommissioning activities. First, NMSS and RES mutually track and coordinate decommissioning activities. Second, the Decommissioning Management Board meets bi-monthly to provide management input on decommissioning activities and issues. The Board, composed of managers from NMSS, RES, NRR, and the regions, along with the Office of the General Counsel, serves as an effective mechanism for integrating inter office and inter regional program activities and issue resolution. The Board is a mechanism by which the staff has enhanced intra agency communication, and it ensures that NRC's regulatory processes are integrated. In addition, RES, NRR, the regions, and Agreement States participate on review teams to comment on draft decommissioning guidance.

7. Programmatic Decommissioning Activities Since Previous Report

In March 2005, the staff published the Integrated Decommissioning Improvement Plan (IDIP), Rev. 1, which describes how the staff plans to implement recommendations from the Decommissioning Program Evaluation, the LTR Analysis recommendations approved by the Commission, Commission direction resulting from the 2004 annual decommissioning briefing, and other improvements. The plan includes a description of each improvement and associated milestones, schedules, and staff assignments.

The IDIP will be updated periodically based on staff assessments, staff decommissioning experience, and independent program reviews such as the Office of the Inspector General (OIG) audits and the Office of Management and Budget (OMB) Performance Assessment Rating Tool (PART) review. This iterative approach of program assessment, followed by improvements, implements a process of "continuous improvement" in the Decommissioning Program.

Major IDIP improvement activities completed in FY 2005 include:

- Preparation of draft revised guidance for public comment that will resolve LTR Analysis issues: (a) restricted use; (b) onsite disposal; (c) realistic scenarios; (d) removal of material after license termination; and (e) intentional mixing of soil;

- Development of a risk-informed approach and guidance for revising inspection and enforcement procedures to reduce potential decommissioning problems at operating sites;

- Enhancement of communications and meaningful involvement of all stakeholders involved with the decommissioning program. The staff's efforts included: (a) significantly updating and improving the Decommissioning Web Page; (b) developing a Decommissioning Brochure; (c) conducting a stakeholder workshop, in April 2005, to seek early input for guidance and suggestions for improving the program; and (d) using a State working group to help develop draft guidance;

- Initiation of improvements to collect, document, and disseminate decommissioning lessons-learned including: (a) developing a decommissioning web page for lessons learned; (b) exchanging information on lessons-learned with stakeholders at the April Decommissioning Workshop; and, (c) beginning to explore a collaborative approach to lessons-learned with industry and Agreement States;

- Revision and expansion of the Decommissioning Directorate Operations Manual to put in place new procedures that implement program improvements including: (a) staff expenditure tracking; (b) prioritization of work; (c) operating plan management; (d) planning for revised guidance; (e) sharing information; (f) updating the IDIP; (g) independent reviews; and, (h) defining the roles of the Offices and Divisions involved with the Comprehensive Decommissioning Program;

All the IDIP improvements that the staff has implemented during FY 2004 and FY 2005 are summarized in the Decommissioning Program Improvements Report which will be issued in September 2005. Although many of the IDIP activities will realize improvements and efficiencies in coming years, there already have been observed efficiencies from programmatic improvements. For example, the recent LTP review for Yankee Rowe, was completed in less time than all previous LTP reviews, because process lessons learned were applied before and during the review.

In addition, the staff continues to implement communication plans for all complex sites. Site-specific communication plans are useful tools to ensure that the appropriate stakeholders are identified and contacted and focuses the staff on messages NRC wants to convey. One of the activities identified in the communication plans for each site is participation in public meetings to inform the public about major licensing actions. During the past year, the staff participated in public meetings for Kiski Valley Water Pollution Control Authority and Ft. Belvoir. Staff also supported an EPA Public Meeting on the proposed listing of the Safety Light site on the EPA National Priorities List.

Further, NRC staff continued to implement the 2002 Memorandum of Understanding between NRC and EPA on Consultation and Finality on Decommissioning and Decontamination of Contaminated Sites. On October 27, 2004, a second set of three Notification letters was sent to the EPA informing them of sites undergoing decommissioning that would have triggered Level 1 Consultation under the memorandum of understanding (MOU) if the DPs for the sites had been submitted after the MOU was signed. The three letters concerned the Kaiser Aluminum site in Oklahoma, the Kerr-McGee, Cimarron site in Oklahoma, and the Union Carbide Corporation site in Tennessee. Further, the staff developed background information and began the process for conducting a Level 2 consultation under the MOU concerning the Cushing Refinery Site in Oklahoma. The staff also continued to develop guidance for implementing the MOU to be included in the revised NUREG-1757 and in the revised Decommissioning Directorate Operations Manual.

The staff also participated in a number of industry conferences and workshops. Examples of conferences and workshops attended by the staff during the past year include Waste Management '05, American Nuclear Society conferences, Fuel Cycle Facilities Forum Meeting, TLG Conference, and Health Physics Society meetings.

8. Resources

The total decommissioning program staff budget, for FY 2005 and FY 2006, is 85 full-time equivalents (FTEs) and 99 FTEs, respectively. These resource figures include: (a) licensing casework directly related to decommissioning sites; (b) inspections; (c) project management and technical support for decommissioning power reactors, uranium mill tailings facilities, and fuel cycle facilities; (d) development of rules and guidance; (e) environmental impact statements and EAs; (f) research to develop more realistic analytical tools to support licensing and rulemaking activities; and (g) Waste Incidental to Reprocessing. These figures also include supervisory and non-supervisory indirect FTE, and training and travel associated with the decommissioning program.

9.0 FY 2006 Planned Programmatic Activities

Follow up actions to implement the IDIP are planned for FY 2006. These actions include:

- Publishing final revised guidance on the LTR issues: restricted use; onsite disposal; realistic scenarios; removal of material after license termination; intentional mixing;

- Revising the IDIP based on OIG review and decommissioning lessons-learned;

- Preparing for, and participating in, an OMB PART review, including a reevaluation of the decommissioning program and effectiveness of improvements;

- Publishing a proposed rule and draft guidance, for public comment, in September 2006, for the rulemaking and supporting guidance on measures to prevent future legacy sites (changes to financial assurance and licensee operations); and

- Continuing to develop decommissioning lessons-learned in conjunction with stakeholders.